MONTHLY PLANS AND PROGRESS REPORT

Title: Evaluation of Usefulness of Skylab EREP S-190 and S-192 Imagery in Multistage Forest Surveys

Period Covered: July 1, 1973 to July 31, 1973

Contract: NAS 9-13289
EREP Investigation #473

EarthSat Project No.: G-091

Principal Investigator: Mr. Philip G. Langley

OVERALL STATUS

We have now received the RB-57 imagery and S-190A imagery of our test site, and have subjected this imagery to a first-look analysis.

All support imagery received to date has been of excellent quality with greater than expected resolution. The RB-57 and S-190A coverages have been cloud free over our test sites on each flight date.

During our manual photo interpretation investigations we will place a great deal of emphasis on these support images to generate a data base of timber volume estimates within our test areas.

The RB-57 imagery (Zeiss camera) 1/60,000 scale photography is of such excellent quality that interpretations made from this coverage could serve as the standard for timber volume estimates concerned with this project.

In our last progress report we stated that we were performing digital interpretation experiments with ERTS-A platform imagery, and that we hoped to obtain some results by the end of this period. In

these experiments the classifier output is related to volume estimates by means of regression analysis to see whether significantly different volume levels are associated with the digitally interpreted land classes.

Under closer scrutiny at the start of these experiments we discovered that it would probably be incorrect to regress the digital interpretation directly on known volumes as determined from ground cruises, as this is not the manner in which the digital interpretation would be used under operational circumstances. Instead, it seemed a better approach to regress on volume estimates obtained from the high-flight platform imagery.

Thus, we had to backtrack, and develop a volume interpretation model for high-flight photography. This model has been developed during the past period with fairly good results, in that almost 50% of the volume variation on the ground could be explained by variables interpreted from the high-flight U-2 imagery. Volume estimates from this model will now be used in the digital interpretation test outlined in the previous report. In addition, we have gained some insight into parameters that can be used for manual interpretation applicable to Skylab imagery, as the resolution of this imagery is not too far removed from that of the high-flight imagery.

EXPECTED ACCOMPLISHMENTS FOR NEXT PERIOD

Our expected accomplishments for the next period fall into the following categories according to the milestone plan:

1. We will do some multi-spectral combining of the S-190A images to gain insight in the significance of the various spectral bands.

2. We will transfer boundaries of the GLO land sections to the S-190A imagery and the RB-57 imagery.
3. We will develop the necessary software to read the S-192 tapes.
4. We will examine whether the S-192 tapes can be processed with the LARS system in our Washington D.C. computer facility. If this will prove to be impossible during the time period indicated in the milestone plan, we will postpone this form of digital interpretation until November, and perform the supervised classification together with the unsupervised classification with the system that is presently under development and in the testing stage.

SIGNIFICANT RESULTS FOR THIS PERIOD

This period we developed a high-flight U-2 imagery (1:120,000) volume interpretation model with which we could explain 50% of the volume variation occurring on the ground.

Two interpreters interpreted 40 GLO land sections with known timber volume in terms of eight variables that could be estimated from the imagery.

A multiple regression study was performed to relate the interpreted variables to the ground volumes. It was found that the "best model" consisted of two basic variables and their squares, namely: (1) the percentage of large trees, and (2) the crown density of the conifers on the parcel. The multiple correlation coefficient was 0.694 for this model.

SUMMARY OUTLOOK FOR THE REMAINING EFFORT TO BE PERFORMED

Our outlook for the remaining period has not changed appreciably. The LARS interpretation of the S-192 tapes will have to be postponed perhaps, otherwise it would seem that the investigation can proceed as planned.

TRAVEL PLANS

None for the next reporting period.